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Appln No. 09/916,243

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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method of fulfilling a data service request, the method comprising:
 - providing an ontology description of a data service, wherein the ontology description of the data service comprises a semantic description of atomic objects associated with the data service;
 - providing a first workflow;
 - providing a plurality of logical search objects operably coupled via a respective one of a plurality of communications links to a respective one of a plurality of data providers and operably coupled to the first workflow;
 - transmitting by the logical search objects to the data providers via the communications links a plurality of search requests, the search requests generated by the first workflow from the data service request;
 - receiving by the logical search objects from the data providers via the communications link a plurality of data sets in response to the search requests;
 - transmitting by the logical search objects to the first workflow the data sets; and
 - generating by the first workflow a knowledge instance from the data sets using the ontology description of the data service.
2. (Previously Presented) The method of claim 1 wherein at least one of the communications links is adapted for communications with a database server.

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3. (Previously Presented) The method of claim 1 wherein at least one of the communications links is adapted for communications with a FTP server.
4. (Previously Presented) The method of claim 1 wherein at least one of the communications links is adapted for communications with a Web server.
5. (Previously Presented) The method of claim 1 wherein at least one of the communications links is adapted for communications with a file system.
6. (Previously Presented) The method of claim 1 wherein at least one of the communications links is adapted for communication with a human data provider.
7. (Previously Presented) The method of claim 1 wherein at least one of the communications links is adapted for communication with a communications protocol proprietary to the data provider.
8. (Original) The method of claim 1 wherein the data service request is included in a XML document.
9. (Canceled)
10. (Canceled)
11. (Previously Presented) The method of claim 1, further comprising:

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providing an application server operably coupling a data client to the first workflow via a service request communications link, and

receiving by the application server from the data client via the service request communications link a data service request message, the data service request message including the data service request;

transmitting by the application server to the first workflow the data service request message; and

transmitting by the first workflow to at least one of the logical search objects the data service request message.

12. (Previously Presented) The method of claim 11, wherein the service request communications link is adapted for communications using SMTP.
13. (Previously Presented) The method of claim 11, wherein the service request communications link is adapted for communications using JMS.
14. (Previously Presented) The method of claim 11, wherein the service request communications link is adapted for communications using HTTP.
15. (Previously Presented) The method of claim 11, wherein the service request communications link is adapted for communications using RMI.
16. (Previously Presented) The method of claim 1, wherein the logical search objects are specified by the first workflow.

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17. (Original) The method of claim 11, wherein the first workflow is specified by the application server using the service request message.
18. (Previously Presented) The method of claim 11 further comprising:
 - providing a formatter; and
 - formatting by the formatter the data set encapsulated in the knowledge instance into a format requested by the data client.
19. (Previously Presented) The method of claim 1 further comprising providing a second workflow operably coupled to the first workflow.
20. (Canceled)
21. (Previously Presented) A method for accessing by a software object a data provider via a communications link, comprising:
 - receiving by the software object from a second software object a search request message document;
 - generating by the software object a data request for the data provider from the search request message document;
 - transmitting by the software object to the data provider the data request via the communications link;
 - receiving by the software object from the data provider a data set via the communications link; and
 - generating by the software object a semantic object from the data set, including:
 - providing a parser adaptor operably coupled to the software object;

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providing a parser semantic description of the data set for use by the parser adaptor;

providing a semantic object semantic description;

generating by the parser adaptor extracted data from the data set using the parser semantic description; and

generating by the parser adaptor the semantic object using the extracted data according to the semantic object semantic description.

22. (Previously Presented) A method for accessing by a software object a data provider via a communications link, comprising:

receiving by the software object from a second software object a search request message document;

generating by the software object a data request for the data provider from the search request message document, including:

providing a request builder operably coupled to the software object;

providing a native object operably coupled to the request builder, the native object encapsulating implementation details of a data request for the data provider;

providing a native semantic description including ontology information describing a data structure used by the request builder to build the data request for the data provider;

transmitting by the request builder to the native object the search request; and

generating by the native object the data request from the search request using the native semantic description;

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transmitting by the software object to the data provider the data request via the communications link;
receiving by the software object from the data provider a data set via the communications link; and
generating by the software object a semantic object from the data set.

23. (Currently Amended) A data processing system adapted to fulfill a data service request, comprising:

a processor; and

a memory operably coupled to the processor and having program instructions stored therein, the processor being operable to execute the program instructions, the program instructions including:

providing an ontology description of a data service, wherein the ontology description of the data service comprises a semantic description of atomic objects associated with the data service;

providing a first workflow;

providing a plurality of logical search objects operably coupled via a respective one of a plurality of communications links to a respective one of a plurality of data providers and operably coupled to the first workflow;

transmitting by the logical search objects to the data providers via the communications links a plurality of search requests, the search requests generated by the first workflow from the data service request;

receiving by the logical search objects from the data providers via the communications link a plurality of data sets in response to the search requests;

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transmitting by the logical search objects to the first workflow the data sets; and

generating by the first workflow a knowledge instance from the data sets using the ontology description of the data service.

24. (Previously Presented) The data processing system of claim 23 at least one of the communications links is adapted for communications with a database server.
25. (Previously Presented) The data processing system of claim 23 wherein at least one of the communications links is adapted for communications with a FTP server.
26. (Previously Presented) The data processing system of claim 23 wherein at least one of the communications links is adapted for communications with a Web server.
27. (Previously Presented) The data processing system of claim 23 wherein at least one of the communications links is adapted for communications with a file system.
28. (Previously Presented) The data processing system of claim 23 wherein at least one of the communications links is adapted for communication with a human data provider.
29. (Previously Presented) The data processing system of claim 23 wherein at least one of the communications links is adapted for communication with a communications protocol proprietary to the data provider.
30. (Original) The data processing system of claim 23 wherein the data service request is included in a XML document.

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31. (Canceled)
32. (Canceled)
33. (Previously Presented) The data processing system of claim 23, the program instructions further including:
 providing an application server operably coupling a data client to the first workflow via a service request communications link, and
 receiving by the application server from the data client via the service request communications link a data service request message, the data service request message including the data service request;
 transmitting by the application server to the first workflow the data service request message; and
 transmitting by the first workflow to at least one of the logical search objects the data service request message.
34. (Previously Presented) The data processing system of claim 33, wherein the service request communications link is adapted for communications using SMTP.
35. (Previously Presented) The data processing system of claim 33, wherein the service request communications link is adapted for communications using JMS.
36. (Previously Presented) The data processing system of claim 33, wherein the service request communications link is adapted for communications using HTTP.

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37. (Previously Presented) The data processing system of claim 33, wherein the service request communications link is adapted for communications using RMI.
38. (Previously Presented) The data processing system of claim 33, wherein the logical search objects are specified by the first workflow.
39. (Original) The data processing system of claim 33, wherein the first workflow is specified by the application server using the service request message.
40. (Previously Presented) The data processing system of claim 33, the program instructions further including:
 providing a formatter; and
 formatting by the formatter the data set encapsulated in the knowledge instance into a format requested by the data client.
41. (Previously Presented) The data processing system of claim 33, the program instructions further including providing a second workflow operably coupled to the first workflow.
42. (Canceled)
43. (Previously Presented) A data processing system adapted to access a data provider via a communications link, comprising:
 a processor; and
 a memory operably coupled to the processor and having program instructions stored therein, the processor being operable to execute the program instructions, the program instructions including:

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receiving by a software object a search request message document;

generating by the software object a data request for the data provider from the search request message document;

transmitting by the software object to the data provider the data request via the communications link;

receiving by the software object from the data provider a data set via the communications link; and

generating by the software object a semantic object from the data set, including:

providing a parser adaptor operably coupled to the software object;

providing a parser semantic description of the data set for use by the parser adaptor;

providing a semantic object semantic description;

generating by the parser adaptor extracted data from the data set using the parser semantic description; and

generating by the parser adaptor the semantic object using the extracted data according to the semantic object semantic description.

44. (Previously Presented) A data processing system adapted to access a data provider via a communications link, comprising:

a processor; and

a memory operably coupled to the processor and having program instructions stored therein, the processor being operable to execute the program instructions, the program instructions including:

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receiving by a software object a search request message document;

generating by the software object a data request for the data provider from the search request message document, including:

providing a request builder operably coupled to the software object;

providing a native object operably coupled to the request builder, the native object encapsulating implementation details of a data request for the data provider;

providing a native semantic description including ontology information describing a data structure used by the request builder to build the data request for the data provider;

transmitting by the request builder to the native object the search request; and

generating by the native object the data request from the search request using the native semantic description;

transmitting by the software object to the data provider the data request via the communications link;

receiving by the software object from the data provider a data set via the communications link; and

generating by the software object a semantic object from the data set.

45. (Currently Amended) A computer readable media embodying program instructions for execution by a computer, the computer program instructions adapting a computer to fulfill a data service request, the program instructions comprising:

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providing an ontology description of a data service,
wherein the ontology description of the data service
comprises a semantic description of atomic objects
associated with the data service;

providing a first workflow;

providing a plurality of logical search objects
operably coupled via a respective one of a plurality of
communications links to a respective one of a plurality of
data providers and operably coupled to the first workflow;

transmitting by the logical search objects to the data
providers via the communications links a plurality of
search requests, the search requests generated by the first
workflow from the data service request;

receiving by the logical search objects from the data
providers via the communications link a plurality of data
sets in response to the search requests;

transmitting by the logical search objects to the
first workflow the data sets; and

generating by the first workflow a knowledge instance
from the data sets using the ontology description of the
data service.

46. (Previously Presented) The computer readable media of claim 45 wherein at least one of the communications links is adapted for communications with a database server.
47. (Previously Presented) The computer readable media of claim 45 wherein at least one of the communications links is adapted for communications with a FTP server.
48. (Previously Presented) The computer readable media of claim 45 wherein at least one of the communications links is adapted for communications with a Web server.

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49. (Previously Presented) The computer readable media of claim 45 wherein at least one of the communications links is adapted for communications with a file system.
50. (Previously Presented) The computer readable media of claim 45 wherein at least one of the communications links is adapted for communication with a human data provider.
51. (Previously Presented) The computer readable media of claim 45 wherein at least one of the communications links is adapted for communication with a communications protocol proprietary to the data provider.
52. (Original) The computer readable media of claim 45 wherein the data service request is included in a XML document..
53. (Canceled)
54. (Canceled)
55. (Previously Presented) The computer readable media of claim 45, the program instructions further comprising:
 providing an application server operably coupling a data client to the first workflow via a service request communications link, and
 receiving by the application server from the data client via the service request communications link a data service request message, the data service request message including the data service request;
 transmitting by the application server to the first workflow the data service request message; and

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transmitting by the first workflow to at least one of the logical search objects the data service request message.

56. (Previously Presented) The computer readable media of claim 55 wherein the service request communications link is adapted for communications using SMTP.
57. (Previously Presented) The computer readable media of claim 55 wherein the service request communications link is adapted for communications using JMS.
58. (Previously Presented) The computer readable media of claim 55 wherein the service request communications link is adapted for communications using HTTP.
59. (Previously Presented) The computer readable media of claim 55 wherein the service request communications link is adapted for communications using RMI.
60. (Previously Presented) The computer readable media of claim 55, wherein at least one of the logical search objects is specified by the first workflow.
61. (Previously Presented) The computer readable media of claim 55, wherein the first workflow is specified by the application server using the service request message.
62. (Previously Presented) The computer readable media of claim 55, the program instructions further comprising:
providing a formatter; and

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formatting by the formatter the data set encapsulated in the knowledge instance into a format requested by the data client.

63. (Previously Presented) The computer readable media of claim 55, the program instructions further comprising providing a second workflow operably coupled to the first workflow.

64. (Canceled)

65. (Previously Presented) A computer readable media embodying program instructions for execution by a computer, the computer program instructions adapting a computer to access a data provider via a communications link, the program instructions comprising:

receiving by a software object a search request message document;

generating by the software object a data request for the data provider from the search request message document;

transmitting by the software object to the data provider the data request via the communications link;

receiving by the software object from the data provider a data set via the communications link; and

generating by the software object a semantic object from the data set, including:

providing a parser adaptor operably coupled to the software object;

providing a parser semantic description of the data set for use by the parser adaptor;

providing a semantic object semantic description;

generating by the parser adaptor extracted data from the data set using the parser semantic description; and

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generating by the parser adaptor the semantic object using the extracted data according to the semantic object semantic description.

66. (Previously Presented) A computer readable media embodying program instructions for execution by a computer, the computer program instructions adapting a computer to access a data provider via a communications link, the program instructions comprising:

receiving by a software object a search request message document;

generating by the software object a data request for the data provider from the search request message document;

providing a request builder operably coupled to the software object;

providing a native object operably coupled to the request builder, the native object encapsulating implementation details of a data request for the data provider;

providing a native semantic description including ontology information describing a data structure used by the request builder to build the data request for the data provider;

transmitting by the request builder to the native object the search request; and

generating by the native object the data request from the search request using the native semantic description.

transmitting by the software object to the data provider the data request via the communications link;

receiving by the software object from the data provider a data set via the communications link; and

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generating by the software object a semantic object from the data set.

67. (Currently Amended) A method of building a knowledge instance for a data service, comprising:

providing a plurality of logical search objects, each logical search object operable to retrieve a data set from one or more data providers;

instantiating by a first workflow one or more logical search objects selected from the plurality of logical search objects;

receiving by the one or more logical search objects data sets from the one or more data providers;

transmitting by the one or more logical search objects to the workflow the data sets; and

generating by the workflow the knowledge instance from the data sets using the an ontology description of a data service, wherein the ontology description of the data service comprises a semantic description of atomic objects associated with the data service.

68. (Previously Presented) The method of claim 67, wherein at least one of the data providers is a database server.

69. (Previously Presented) The method of claim 67, wherein at least one of the data providers is a FTP server.

70. (Previously Presented) The method of claim 67, wherein at least one of the data providers is a Web server.

71. (Previously Presented) The method of claim 67, wherein at least one of the data providers is a file system.

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72. (Previously Presented) The method of claim 67, wherein at least one of the data providers is a human data provider.
73. (Previously Presented) The method of claim 67 wherein at least one of the logical search objects is coupled to at least one data provider via a communications link adapted for communications using a communications protocol proprietary to the data provider.
74. (Previously Presented) The method of claim 67 further comprising providing a second workflow operably coupled to the first workflow.
75. (Previously Presented) The method of claim 67, further comprising:
 providing an application server operably coupling a data client to the first workflow via a service request communications link, and
 receiving by the application server from the data client via the service request communications link a data service request message, the data service request message including a data service request;
 transmitting by the application server to the first workflow the data service request message; and
 transmitting by the first workflow to at least one of the logical search objects the data service request message.
76. (Previously Presented) The method of claim 75, wherein the first workflow is specified by the application server using the service request message.

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77. (Previously Presented) The method of claim 75, further comprising:
 providing a formatter; and
 formatting by the formatter the knowledge instance into a format requested by the data client.
78. (Previously Presented) The method of claim 75, wherein the service request communications link is adapted for communications using SMTP.
79. (Previously Presented) The method of claim 75, wherein the service request communications link is adapted for communications using JMS.
80. (Previously Presented) The method of claim 75, wherein the service request communications link is adapted for communications using HTTP.
81. (Previously Presented) The method of claim 75, wherein the service request communications link is adapted for communications using RMI.
82. (Currently Amended) A data processing system adapted to build a knowledge instance for a data service, comprising:
 a processor; and
 a memory operably coupled to the processor and having program instructions stored therein, the processor being operable to execute the program instructions, the program instructions including:
 providing a plurality of logical search objects, each logical search object operable to retrieve a data set from one or more data providers;

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instantiating by a first workflow one or more logical search objects selected from the plurality of logical search objects;

receiving by the one or more logical search objects data sets from the one or more data providers;

transmitting by the one or more logical search objects to the workflow the data sets; and

generating by the workflow the knowledge instance from the data sets using the an ontology description of a data service, wherein the ontology description of the data service comprises a semantic description of atomic objects associated with the data service.

83. (Previously Presented) The data processing system of claim 82, wherein at least one of the data providers is a database server.
84. (Previously Presented) The data processing system of claim 82, wherein at least one of the data providers is a FTP server.
85. (Previously Presented) The data processing system of claim 82, wherein at least one of the data providers is a Web server.
86. (Previously Presented) The data processing system of claim 82, wherein at least one of the data providers is a file system.
87. (Previously Presented) The data processing system of claim 82, wherein at least one of the data providers is a human data provider.

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88. (Previously Presented) The data processing system of claim 82, wherein at least one of the logical search objects is coupled to at least one data provider via a communications link adapted for communications using a communications protocol proprietary to the data provider.
89. (Previously Presented) The data processing system of claim 82, the program instructions further including providing a second workflow operably coupled to the first workflow.
90. (Previously Presented) The data processing system of claim 82, the program instructions further including:
 providing an application server operably coupling a data client to the first workflow via a service request communications link, and
 receiving by the application server from the data client via the service request communications link a data service request message, the data service request message including a data service request;
 transmitting by the application server to the first workflow the data service request message; and
 transmitting by the first workflow to at least one of the logical search objects the data service request message.
91. (Previously Presented) The data processing system of claim 90, wherein the first workflow is specified by the application server using the service request message.
92. (Previously Presented) The data processing system of claim 90, further comprising:
 providing a formatter; and

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formatting by the formatter the knowledge instance
into a format requested by the data client.

93. (Previously Presented) The data processing system of claim 90, wherein the service request communications link is adapted for communications using SMTP.
94. (Previously Presented) The data processing system of claim 90, wherein the service request communications link is adapted for communications using JMS.
95. (Previously Presented) The data processing system of claim 90, wherein the service request communications link is adapted for communications using HTTP.
96. (Previously Presented) The data processing system of claim 90, wherein the service request communications link is adapted for communications using RMI.

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